



Carnival Game Designer

Performance Task

Introduction

Fairs, festivals and carnivals are celebrated all around the world. Some are designed to celebrate holidays or to commemorate special events. Others are designed to raise money.

Most carnivals have games of chance or skill. People pay money or use a ticket to play a game with the hope of winning a prize. Games can be simple, such as a ring toss, or complex such as a dunk tank. Many games use concepts of force, motion, magnetism and simple machines. Through this task, individuals and teams will take on the role of a carnival game designer, creating, testing and building a carnival game that uses a simple machine or magnet to operate. The game must operate consistently and fairly and be fun for all ages to play.

Big Idea / Essential Questions

Big Idea

- Engineers analyze existing systems to see where flaws might occur or to test possible solutions to a new problem.
- Engineers investigate to help identify how effective, efficient, and durable their designs may be under a range of conditions.
- In engineering, reasoning and argument are essential for finding the best possible solution to a problem.

Essential Questions

- How do simple machines combine to make work easier?
- How can physical interactions of objects be described?
- How can one explain and predict interactions between objects?

G.R.A.S.P.

Goal

Your goal is to use what you know about simple machines and magnets to design a carnival game that operates consistently and fairly and be fun for all ages to play.

Role

You are a carnival game designer. You and your team of engineers have been studying simple machines and how they can be used to create games that are consistent, fair and fun.

Audience

Your audience is a charity hoping to raise funds for a cause using your carnival games.

Situation

Charities around the world host fundraisers to raise money for their causes. One way they raise money is by holding events, such as carnivals. People buy tickets and spend money at the event. The money raised is used to help people. You are a carnival game designer. You and your team of engineers have been studying simple machines to determine how they can be used to create games that are consistent, fair and fun. If people like playing your game, they will buy tickets and spend a lot of money to play it. This means more funds raised for the charity.

Products

1. Carnival Game Research

Carnival games come in all kinds, from very simple to very complex. Some are homemade and some are mechanical. Many use simple machines or magnets. There are six types of simple machines that can be combined to make compound machines. Simple machines use forces such as a push or pull to make parts move. Magnets use magnetic fields to attract or repel objects made of iron or steel. You will need to research carnival games. As you learn about different games, you will identify and record the magnets, simple and compound machines that make them work. Record which simple machines and magnetic elements are used most often and how the simple machine or magnet makes the game consistent, fair and fun. The purpose of this research is to help you design your own game. It will be helpful to keep notes as you research, including ideas and drawings for what you might wish to create.

Carnival Game Research

Achievement Levels	1	2	3	4
Forces and Motion (x1)	Product demonstrates little understanding of the way two forces interact with one another and can affect motion.	Product demonstrates some understanding of the way two forces interact with one another and can affect motion.	Product demonstrates adequate understanding of the way two forces interact with one another and can affect motion.	Product demonstrates deep, thorough understanding of the way two forces interact with one another and can affect motion.
Research (x1)	Product shows that little research was done around	Product shows that some research was done around	Product shows that research was done around the topic.	Product shows that thorough research was done around the

Achievement Levels	the topic.	1	the topic.	2	3	topic.	4
Organization of Data (x1)		Data is unorganized and has few labels to help the reader understand the information.	Data is somewhat organized and has some labels to help the reader understand the information.	Data is organized and has labels to help the reader understand most of the information.	Data is very organized and has appropriate labels to help the reader understand all of the information.		
Content (x1)		Little critical information about simple machines and magnets is included within the product.	Some critical information about simple machines and magnets is included within the product.	Most critical information about simple machines and magnets is included within the product.	All critical information about simple machines and magnets is included within the product.		

2. Simple Machines/Magnet Scavenger Hunt

Simple machines and magnets can be found almost anywhere. Practical uses of magnets are found around the house, at school and even inside your computer! Simple machines have been used for centuries to make work easier. Engineers often use simple machines and magnets as the basis of their designs. You will need to go on a simple machines/magnets hunt. You can make a list or take pictures of the examples you see around the school or in your home. Organize your findings into categories. You will need these examples to inspire your own design!

Simple Machines/Magnets Scavenger Hunt

Achievement Levels	1	2	3	4
Forces and Motion (x1)	Product demonstrates little understanding of the way two forces interact with one another and can affect motion.	Product demonstrates some understanding of the way two forces interact with one another and can affect motion.	Product demonstrates adequate understanding of the way two forces interact with one another and can affect motion.	Product demonstrates deep, thorough understanding of the way two forces interact with one another and can affect motion.
Research (x1)	Product shows that little research was done around the topic.	Product shows that some research was done around the topic.	Product shows that research was done around the topic.	Product shows that thorough research was done around the topic.
Organization of Data (x1)	Data is unorganized and has few labels to help the reader understand the information.	Data is somewhat organized and has some labels to help the reader understand the information.	Data is organized and has labels to help the reader understand most of the information.	Data is very organized and has appropriate labels to help the reader understand all of the information.
Content (x1)	Little critical information about simple machines and magnets is included within the product.	Some critical information about simple machines and magnets is included within the product.	Most critical information about simple machines and magnets is included within the product.	All critical information about simple machines and magnets is included within the product.

3. Carnival Game e-Portfolio

Creating a new design involves many steps. After completing the ideation phase where several different design ideas are generated, engineers create prototypes based on the best features of each possible design. They then test their product and gather data on what works and does not work. Next, they often redesign dozens of times before completing a final product. You will need to create an e-Portfolio, documenting the steps you take to design a carnival game. The portfolio may include original drawings, video reflections, data collected and written work. You will want to explain any major

challenges and how you overcame them. The documented results may be helpful to you as you continue to refine your ideas.

Carnival Game e-Portfolio

Achievement Levels	1	2	3	4
Forces and Motion (x1)	Product demonstrates little understanding of practical application of simple machines and magnets.	Product demonstrates some understanding of practical application of simple machines and magnets.	Product demonstrates adequate understanding of practical application of simple machines and magnets.	Product demonstrates deep, thorough understanding of practical application of simple machines and magnets.
Problem Solving and Design (x1)	The product minimally solves the problem by considering the needs of the target audience.	The product somewhat solves the problem by considering attributes, aesthetics and needs of the target audience.	The product sufficiently solves the problem by addressing the attributes, aesthetics and needs of the target audience through the guidelines and requirements provided.	The product thoroughly solves the problem by addressing the attributes, aesthetics and needs of the target audience through the guidelines and requirements provided.
ePortfolio Completion (x1)	The electronic portfolio uses software to present minimal data, artifacts and information.	The electronic portfolio uses appropriate software to present some appropriate data, artifacts and information in an audience friendly manner.	The electronic portfolio uses appropriate software to present a majority of all needed data, artifacts and information in an audience friendly manner.	The electronic portfolio uses appropriate software to exceptionally present all needed data, artifacts and information in an audience friendly manner.
Data Analysis (x1)	Product contains an inadequate understanding of analyzing and interpreting data.	Product contains a partial understanding of analyzing and interpreting data.	Product contains a moderate understanding of analyzing and interpreting data.	Product contains a thorough understanding of analyzing and interpreting data.
Media Integration (x1)	Little of the media used, such as photos, video and sound, tightly connect to the purpose of the product.	Some media used, such as photos, video and sound, tightly connect to the purpose of the product.	Most media used, such as photos, video and sound, tightly connect to the purpose of the product.	All media used, such as photos, video and sound, tightly connect to the purpose of the product.

4. Carnival Game Prototype

Engineers and designers usually create prototypes before they produce a final design. The prototype shows how the final design will work but is usually inexpensive to create and can be adjusted based on feedback. You will need to create a prototype of your game. You can use simple materials such as paper or cardboard. Your prototype should show what the final design will look like, but you should be prepared to adjust based on tests and feedback. Share your design with others, such as kids who might enjoy playing your game, to get feedback on how fair, consistent and fun the game is.

Carnival Game Prototype

Achievement Levels	1	2	3	4
Forces and Motion (x1)	Product demonstrates little understanding of practical application of simple machines and magnets.	Product demonstrates some understanding of practical application of simple machines and magnets.	Product demonstrates adequate understanding of practical application of simple machines and magnets.	Product demonstrates deep, thorough understanding of practical application of simple machines and magnets.
Testing Game Design (x1)	Student(s) attempted to plan and carry out tests to gather data about consistency, fairness and fun of the game design.	Student(s) somewhat effectively planned and carried out tests to gather data about consistency, fairness and fun of the game design.	Student(s) mostly effectively planned and carried out tests to gather data about consistency, fairness and fun of the game design.	Student(s) effectively planned and carried out tests to gather data about consistency, fairness and fun of the game design.
Creativity and Innovation (x1)	Product demonstrates little use of creative and innovative thinking throughout the engineering and design process.	Product demonstrates partial use of creative and innovative thinking throughout the engineering and design process.	Product demonstrates sufficient use of creative and innovative thinking throughout the engineering and design process.	Product demonstrates expert use of creative and innovative thinking throughout the engineering and design process.
Engineering as a Solution (x1)	Product demonstrates little problem solving skills and creative thinking throughout the design process.	Product demonstrates some use of problem solving and creative thinking throughout the design process.	Product demonstrates adequate use of problem solving and creative thinking throughout the design process.	Product demonstrates excellent use of problem solving and creative thinking throughout the design process.

5. Multimedia Presentation-Carnival Game Demonstration (suggested final product)

Your goal is to create a game that is fair, consistent and fun. More importantly, however, your game should be so successful that people would like to pay to play it over and over again to raise money for an important cause. You will need to create a multimedia presentation demonstrating your final game design. This presentation will help organizers of the charity you are helping understand how your game works. The game should be as fair, consistent and fun as possible. You can use diagrams, pictures and video to explain how the game uses magnets and simple machines to work. Be sure to include your research about simple machines and magnets as well as the data you collected while designing your game.

Multimedia Presentation

Achievement Levels	1	2	3	4
Engineering Design (x1)	Student shows little understanding of practical application of simple machines and magnets and is unable to give an explanation along with a demonstration.	Student shows some understanding of practical application of simple machines and magnets and can give an explanation along with a demonstration.	Student shows understanding of practical application of simple machines and magnets and can give an explanation with a demonstration.	Student shows excellent understanding of practical application of simple machines and magnets and can give a thorough explanation with a demonstration.
Research (x1)	Product shows that little research was conducted around the topic.	Product shows that some research was conducted around the topic.	Product shows that research was conducted around the topic.	Product shows that thorough research was conducted around the topic.
Multimedia Presentation (x1)	Presentation lacks focus and is not very well organized with any important information for the viewer.	Presentation has some focus and is somewhat organized with information for the viewer.	Presentation has focus and is organized using important information for the viewer.	Presentation has good focus and is well organized using important information for the viewer.

Achievement Levels	1	2	3	4
Oral Presentation (x1)	Presenter makes little eye contact but needs to work on good posture and voice volume for a presentation.	Presenter makes some eye contact, may have adequate posture and voice volume throughout some of the presentation.	Presenter makes eye contact, has good posture and adequate volume throughout most of the presentation.	Presenter makes very good eye contact, has excellent posture and voice volume throughout the whole presentation.